

SEQUENCE LISTING

<110> LONGACRE-ANDRE, SHIRLEY
 ROTH, CHARLES
 NATO, FARIDABANO
 BARNWELL, JOHN
 MENDIS, KAMINI

<120> RECOMBINANT PROTEIN CONTAINING A C-TERMINAL FRAGMENT OF
 PLASMODIUM MSP-1

<130> 0660-0135-0XCIP

<140> 09/134,333

<141> 1998-08-14

<150> PCT/FR97/00290

<151> 1997-02-14

<150> FR96/01822

<151> 1996-02-14

<160> 14

<170> PatentIn Ver. 2.1

<210> 1

<211> 291

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: SYNTHETIC

<220>

<221> CDS

<222> (1)..(291)

<400> 1

gaa	ttc	aac	atc	tcg	cag	cac	caa	tgc	gtg	aaa	aaa	caa	tgt	ccc	gag	48
Glu	Phe	Asn	Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu	
1				5				10					15			

aac	tct	ggc	tgt	ttc	aga	cac	ttg	gac	gag	aga	gag	gag	tgt	aaa	tgt	96
Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys	
		20					25					30				

ctg	ctg	aac	tac	aaa	cag	gag	ggc	gac	aag	tgc	gtg	gag	aac	ccc	aac	144
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Leu	Leu	Asn	Tyr	Lys	Gln	Glu	Gly	Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn		
		35					40					45					
ccg	acc	tgt	aac	gag	aac	aac	ggc	ggc	tgt	gac	gca	gac	gcc	aaa	tgc	192	
Pro	Thr	Cys	Asn	Glu	Asn	Asn	Gly	Gly	Cys	Asp	Ala	Asp	Ala	Lys	Cys		
	50					55					60						
acc	gag	gag	gac	tcg	ggc	agc	aac	ggc	aag	aaa	atc	acg	tgt	gag	tgt	240	
Thr	Glu	Glu	Asp	Ser	Gly	Ser	Asn	Gly	Lys	Lys	Ile	Thr	Cys	Glu	Cys		
	65				70					75					80		
acc	aaa	ccc	gac	tcg	tac	ccg	ctg	ttc	gac	ggc	atc	ttc	tgc	agc	taa	288	
Thr	Lys	Pro	Asp	Ser	Tyr	Pro	Leu	Phe	Asp	Gly	Ile	Phe	Cys	Ser			
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taa																291	

<210> 2
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 <223> Description of Artificial Sequence: SYNTHETIC

Glu	Phe	Asn	Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu		
1				5					10					15			
Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys		
		20						25					30				
Leu	Leu	Asn	Tyr	Lys	Gln	Glu	Gly	Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn		
		35					40					45					
Pro	Thr	Cys	Asn	Glu	Asn	Asn	Gly	Gly	Cys	Asp	Ala	Asp	Ala	Lys	Cys		
	50					55				60							
Thr	Glu	Glu	Asp	Ser	Gly	Ser	Asn	Gly	Lys	Lys	Ile	Thr	Cys	Glu	Cys		
	65				70					75					80		
Thr	Lys	Pro	Asp	Ser	Tyr	Pro	Leu	Phe	Asp	Gly	Ile	Phe	Cys	Ser			
				85					90					95			

<210> 3
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 <212> DNA
 <213> Plasmodium falciparum

<400> 3
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 catttagatg aaagagaaga atgtaaatgt ttatttaaatt acaaacaaga aggtgataaa 120

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tgtgttgaaa atccaaatcc tacttgtaac gaaaataatg gtggatgtga tgcagatgcc 180
aaatgtaccg aagaagattc aggtagcaac ggaaagaaaa tcacatgtga atgtactaaa 240
cctgattctt atccactttt cgatgggtatt ttctgcagt 279
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<211> 354

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:SYNTHETIC

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<221> CDS

<222> (1)..(354)

<400> 4

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Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu
  1             5             10             15

aac tct ggc tgt ttc aga cac ttg gac gag aga gag gag tgt aaa tgt 96
Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys
      20             25             30

ctg ctg aac tac aaa cag gag ggc gac aag tgc gtg gag aac ccc aac 144
Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn
      35             40             45

ccg acc tgt aac gag aac aac ggc ggc tgt gac gca gac gcc aaa tgc 192
Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys
      50             55             60

acc gag gag gac tcg ggc agc aac ggc aag aaa atc acg tgt gag tgt 240
Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys
      65             70             75             80

acc aaa ccc gac tcg tac ccg ctg ttc gac ggc atc ttc tgc agc tcc 288
Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser Ser
      85             90             95

tct aac ttc ttg ggc atc tcg ttc ttg ttg atc ctc atg ttg atc ttg 336
Ser Asn Phe Leu Gly Ile Ser Phe Leu Leu Ile Leu Met Leu Ile Leu
      100             105             110

tac agc ttc att taa taa 354
Tyr Ser Phe Ile
      115
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<210> 5
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 <213> Artificial Sequence
 <223> Description of Artificial Sequence:SYNTHETIC

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 Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu
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 Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys
 20 25 30
 Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn
 35 40 45
 Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys
 50 55 60
 Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys
 65 70 75 80
 Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser Ser
 85 90 95
 Ser Asn Phe Leu Gly Ile Ser Phe Leu Leu Ile Leu Met Leu Ile Leu
 100 105 110
 Tyr Ser Phe Ile
 115

<210> 6
 <211> 342
 <212> DNA
 <213> Plasmodium falciparum

<400> 6
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 catttagatg aaagagaaga atgtaaatgt ttattaaatt acaaacaaga aggtgataaa 120
 tgtgttgaaa atccaaatcc tacttgtaac gaaaataatg gtggatgtga tgcagatgcc 180
 aaatgtaccg aagaagattc aggtagcaac ggaaagaaaa tcacatgtga atgtactaaa 240
 cctgattctt atccactttt cgatggtatt ttctgcagtt cctctaactt cttaggaata 300
 tcattcttat taatactcat gttaatatta tacagtttca tt 342

<210> 7
 <211> 387
 <212> DNA
 <213> Plasmodium falciparum

<220>
 <221> CDS
 <222> (1)..(387)

<400> 7

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1 5 10 15	
 gaa ttc aac atc tcg cag cac caa tgc gtg aaa aaa caa tgt ccc gag	96
Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu	
20 25 30	
 gaa ttc aac atc tcg cag cac caa tgc gtg aaa aaa caa tgt ccc gag	144
Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu	
35 40 45	
 aac tct ggc tgt ttc aga cac ttg gac gag aga gag gag tgt aaa tgt	192
Asn Ser Gly Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys	
50 55 60	
 ctg ctg aac tac aaa cag gag ggc gac aag tgc gtg gag aac ccc aac	240
Leu Leu Asn Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn	
65 70 75 80	
 ccg acc tgt aac gag aac aac ggc ggc tgt gac gca gac gcc aaa tgc	288
Pro Thr Cys Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys	
85 90 95	
 acc gag gag gac tcg ggc agc aac ggc aag aaa atc acg tgt gag tgt	336
Thr Glu Glu Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys	
100 105 110	
 acc aaa ccc gac tcg tac ccg ctg ttc gac ggc atc ttc tgc agc taa	384
Thr Lys Pro Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser	
115 120 125	
 taa	387

<210> 8

<211> 127

<212> PRT

<213> Plasmodium falciparum

<400> 8

Met Lys Ala Leu Leu Phe Leu Phe Ser Phe Ile Phe Phe Val Thr Lys	
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Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu	
20 25 30	
Glu Phe Asn Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu	
35 40 45	

Asn	Ser	Gly	Cys	Phe	Arg	His	Leu	Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys	
	50					55					60					
Leu	Leu	Asn	Tyr	Lys	Gln	Glu	Gly	Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn	
65					70					75					80	
Pro	Thr	Cys	Asn	Glu	Asn	Asn	Gly	Gly	Cys	Asp	Ala	Asp	Ala	Lys	Cys	
				85					90					95		
Thr	Glu	Glu	Asp	Ser	Gly	Ser	Asn	Gly	Lys	Lys	Ile	Thr	Cys	Glu	Cys	
			100					105					110			
Thr	Lys	Pro	Asp	Ser	Tyr	Pro	Leu	Phe	Asp	Gly	Ile	Phe	Cys	Ser		
		115					120					125				

<210> 9

<211> 330

<212> DNA

<213> Plasmodium falciparum

<220>

<221> CDS

<222> (1)..(330)

<400> 9

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1				5					10					15		
atc	tcg	cag	cac	caa	tgc	gtg	aaa	aaa	caa	tgt	ccc	gag	aac	tct	ggc	96
Ile	Ser	Gln	His	Gln	Cys	Val	Lys	Lys	Gln	Cys	Pro	Glu	Asn	Ser	Gly	
			20					25					30			
tgt	ttc	aga	cac	ttg	gac	gag	aga	gag	gag	tgt	aaa	tgt	ctg	ctg	aac	144
Cys	Phe	Arg	His	Leu	Asp	Glu	Arg	Glu	Glu	Cys	Lys	Cys	Leu	Leu	Asn	
		35					40					45				
tac	aaa	cag	gag	ggc	gac	aag	tgc	gtg	gag	aac	ccc	aac	ccg	acc	tgt	192
Tyr	Lys	Gln	Glu	Gly	Asp	Lys	Cys	Val	Glu	Asn	Pro	Asn	Pro	Thr	Cys	
	50					55					60					
aac	gag	aac	aac	ggc	ggc	tgt	gac	gca	gac	gcc	aaa	tgc	acc	gag	gag	240
Asn	Glu	Asn	Asn	Gly	Gly	Cys	Asp	Ala	Asp	Ala	Lys	Cys	Thr	Glu	Glu	
65				70						75					80	
gac	tcg	ggc	agc	aac	ggc	aag	aaa	atc	acg	tgt	gag	tgt	acc	aaa	ccc	288
Asp	Ser	Gly	Ser	Asn	Gly	Lys	Lys	Ile	Thr	Cys	Glu	Cys	Thr	Lys	Pro	
				85					90					95		
gac	tcg	tac	ccg	ctg	ttc	gac	ggc	atc	ttc	tgc	agc	taa	taa			330
Asp	Ser	Tyr	Pro	Leu	Phe	Asp	Gly	Ile	Phe	Cys	Ser					

100

105

110

<210> 10
 <211> 108
 <212> PRT
 <213> Plasmodium falciparum

<400> 10
 Glu Thr Glu Ser Tyr Lys Gln Leu Val Ala Asn Val Asp Glu Phe Asn
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 Ile Ser Gln His Gln Cys Val Lys Lys Gln Cys Pro Glu Asn Ser Gly
 20 25 30
 Cys Phe Arg His Leu Asp Glu Arg Glu Glu Cys Lys Cys Leu Leu Asn
 35 40 45
 Tyr Lys Gln Glu Gly Asp Lys Cys Val Glu Asn Pro Asn Pro Thr Cys
 50 55 60
 Asn Glu Asn Asn Gly Gly Cys Asp Ala Asp Ala Lys Cys Thr Glu Glu
 65 70 75 80
 Asp Ser Gly Ser Asn Gly Lys Lys Ile Thr Cys Glu Cys Thr Lys Pro
 85 90 95
 Asp Ser Tyr Pro Leu Phe Asp Gly Ile Phe Cys Ser
 100 105

<210> 11
 <211> 379
 <212> PRT
 <213> Plasmodium cynomolgi

<220>
 <223> Amino Acids 1-139- REGION I

<220>
 <223> Amino Acids 140-177-REGION II

<220>
 <223> Amino Acids 178-282-REGION III

<220>
 <223> Amino Acids 283-379-REGION IV

<400> 11
 Asp Gln Val Thr Thr Gly Glu Ala Glu Ser Glu Ala Pro Glu Ile Ile
 1 5 10 15
 Val Pro Gln Gly Ile Asn Glu Tyr Asp Val Val Tyr Ile Lys Pro Leu
 20 25 30

Ala	Gly	Met	Tyr	Lys	Thr	Ile	Lys	Lys	Pro	Leu	Glu	Asn	His	Val	Asn	
		35					40					45				
Ala	Leu	Asn	Thr	Asn	Ile	Ile	Asp	Met	Leu	Asp	Ser	Arg	Leu	Lys	Lys	
	50					55					60					
Arg	Asn	Tyr	Phe	Leu	Asp	Val	Leu	Asn	Ser	Asp	Leu	Asn	Pro	Tyr	Ser	
65					70					75					80	
Ile	Pro	His	Ser	Gly	Glu	Tyr	Ile	Ile	Lys	Asp	Pro	Tyr	Lys	Leu	Leu	
				85					90					95		
Asp	Leu	Glu	Lys	Lys	Lys	Leu	Leu	Gly	Ser	Tyr	Lys	Tyr	Ile	Gly	Ala	
			100					105					110			
Ser	Val	Asp	Lys	Asp	Met	Val	Thr	Ala	Asn	Asp	Gly	Leu	Ala	Tyr	Tyr	
		115					120					125				
Gln	Lys	Met	Gly	Asp	Leu	Tyr	Lys	Lys	His	Leu	Asp	Glu	Val	Asn	Ala	
	130					135					140					
Cys	Ile	Lys	Glu	Val	Glu	Ala	Asn	Ile	Asn	Lys	His	Asp	Glu	Glu	Ile	
145					150					155					160	
Lys	Lys	Ile	Gly	Ser	Glu	Ala	Ser	Lys	Ala	Asn	Asp	Lys	Asn	Gln	Leu	
				165					170					175		
Asn	Ala	Lys	Lys	Glu	Glu	Leu	Gln	Lys	Tyr	Leu	Pro	Phe	Leu	Ser	Ser	
			180					185					190			
Ile	Gln	Lys	Glu	Tyr	Ser	Thr	Leu	Val	Asn	Lys	Val	His	Ser	Tyr	Thr	
		195					200					205				
Asp	Thr	Leu	Lys	Lys	Ile	Ile	Asn	Asn	Cys	Gln	Ile	Glu	Lys	Lys	Glu	
	210					215					220					
Thr	Glu	Thr	Ile	Val	Asn	Lys	Leu	Glu	Asp	Tyr	Ser	Lys	Met	Asp	Glu	
225					230					235					240	
Glu	Leu	Asp	Val	Tyr	Lys	Gln	Ser	Lys	Lys	Glu	Asp	Asp	Val	Lys	Ser	
				245					250					255		
Ser	Gly	Leu	Leu	Glu	Lys	Leu	Met	Asn	Ser	Lys	Leu	Ile	Asn	Gln	Glu	
			260					265					270			
Glu	Ser	Lys	Lys	Ala	Leu	Ser	Glu	Leu	Leu	Asn	Val	Gln	Thr	Gln	Met	
		275					280					285				
Leu	Asn	Met	Ser	Ser	Glu	His	Arg	Cys	Ile	Asp	Thr	Asn	Val	Pro	Glu	

290		295		300
Asn Ala Ala Cys Tyr Arg Tyr Leu Asp Gly Thr Glu Glu Trp Arg Cys				
305		310		315 320
Leu Leu Tyr Phe Lys Glu Asp Ala Gly Lys Cys Val Pro Ala Pro Asn				
	325		330	335
Met Thr Cys Lys Asp Lys Asn Gly Gly Cys Ala Pro Glu Ala Glu Cys				
	340		345	350
Lys Met Asn Asp Lys Asn Glu Ile Val Cys Lys Cys Thr Lys Glu Gly				
	355		360	365
Ser Glu Pro Leu Phe Glu Gly Val Phe Cys Ser				
370		375		

<210> 12
 <211> 380
 <212> PRT
 <213> Plasmodium vivax-like sp.

<220>
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<220>
 <223> Amino Acids 141-178-REGION II

<220>
 <223> Amino Acids 179-283-REGION III

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Val Pro Ala Gly Ile Ser Asp Tyr Asp Val Val Tyr Leu Lys Pro Leu
20 25 30
Ala Gly Met Tyr Lys Thr Ile Lys Lys Gln Leu Glu Asn His Val Asn
35 40 45
Ala Phe Asn Thr Asn Ile Thr Asp Met Leu Asp Ser Arg Leu Lys Lys
50 55 60
Arg Asn Tyr Phe Leu Glu Val Leu Asn Ser Asp Leu Asn Pro Phe Lys

65						70						75						80
Tyr	Ser	Pro	Ser	Gly	Glu	Tyr	Ile	Ile	Lys	Asp	Pro	Tyr	Lys	Leu	Leu			
				85					90					95				
Asp	Leu	Glu	Lys	Lys	Lys	Lys	Leu	Leu	Gly	Ser	Tyr	Lys	Tyr	Ile	Gly			
			100					105					110					
Ala	Ser	Ile	Asp	Lys	Asp	Leu	Ala	Thr	Ala	Asn	Asp	Gly	Val	Thr	Tyr			
		115					120					125						
Tyr	Asn	Lys	Met	Gly	Glu	Leu	Tyr	Lys	Thr	His	Leu	Thr	Ala	Val	Asn			
	130					135					140							
Glu	Glu	Val	Lys	Lys	Val	Glu	Ala	Asp	Ile	Lys	Ala	Glu	Asp	Asp	Lys			
145					150					155					160			
Ile	Lys	Lys	Ile	Gly	Ser	Asp	Ser	Thr	Lys	Thr	Thr	Glu	Lys	Thr	Gln			
				165					170					175				
Ser	Met	Ala	Lys	Lys	Ala	Glu	Leu	Glu	Lys	Tyr	Leu	Pro	Phe	Leu	Asn			
			180					185					190					
Ser	Leu	Gln	Lys	Glu	Tyr	Glu	Ser	Leu	Val	Ser	Lys	Val	Asn	Thr	Tyr			
		195					200					205						
Thr	Asp	Asn	Leu	Lys	Lys	Val	Ile	Asn	Asn	Cys	Gln	Leu	Glu	Lys	Lys			
	210					215					220							
Glu	Ala	Glu	Ile	Thr	Val	Lys	Lys	Leu	Gln	Asp	Tyr	Asn	Lys	Met	Asp			
225					230					235					240			
Glu	Lys	Leu	Glu	Glu	Tyr	Lys	Lys	Ser	Glu	Lys	Lys	Asn	Glu	Val	Lys			
				245					250					255				
Ser	Ser	Gly	Leu	Leu	Glu	Lys	Leu	Met	Lys	Ser	Lys	Leu	Ile	Lys	Glu			
			260					265					270					
Asn	Glu	Ser	Lys	Glu	Ile	Leu	Ser	Gln	Leu	Leu	Asn	Val	Gln	Thr	Gln			
		275					280					285						
Leu	Leu	Thr	Met	Ser	Ser	Glu	His	Thr	Cys	Ile	Asp	Thr	Asn	Val	Pro			
						295					300							
Asp	Asn	Ala	Ala	Cys	Tyr	Arg	Tyr	Leu	Asp	Gly	Thr	Glu	Glu	Trp	Arg			
305					310					315					320			
Cys	Leu	Leu	Thr	Phe	Lys	Glu	Glu	Gly	Gly	Lys	Cys	Val	Pro	Ala	Ser			
				325					330					335				

Asn Val Thr Cys Lys Asp Asn Asn Gly Gly Cys Ala Pro Glu Ala Glu
340 345 350

Cys Lys Met Thr Asp Ser Asn Lys Ile Val Cys Lys Cys Thr Lys Glu
355 360 365

Gly Ser Glu Pro Leu Phe Glu Gly Val Phe Cys Ser
370 375 380

<210> 13
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<220>
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<220>
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<220>
<223> Amino Acids 284-380-REGION IV

<400> 13
Asp Gln Val Thr Thr Gly Glu Ala Glu Ser Glu Ala Pro Glu Ile Leu
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Val Pro Ala Gly Ile Ser Asp Tyr Asp Val Val Tyr Leu Lys Pro Leu
20 25 30

Ala Gly Met Tyr Lys Thr Ile Lys Lys Gln Leu Glu Asn His Val Asn
35 40 45

Ala Phe Asn Thr Asn Ile Thr Asp Met Leu Asp Ser Arg Leu Lys Lys
50 55 60

Arg Asn Tyr Phe Leu Glu Val Leu Asn Ser Asp Leu Asn Pro Phe Lys
65 70 75 80

Tyr Ser Ser Ser Gly Glu Tyr Ile Ile Lys Asp Pro Tyr Lys Leu Leu
85 90 95

Asp Leu Glu Lys Lys Lys Lys Leu Ile Gly Ser Tyr Lys Tyr Ile Gly
100 105 110

Ala	Ser	Ile	Asp	Met	Asp	Leu	Ala	Thr	Ala	Asn	Asp	Gly	Val	Thr	Tyr			
		115					120					125						
Tyr	Asn	Lys	Met	Gly	Glu	Leu	Tyr	Lys	Thr	His	Leu	Asp	Gly	Val	Lys			
	130					135					140							
Thr	Glu	Ile	Lys	Lys	Val	Glu	Asp	Asp	Ile	Lys	Lys	Gln	Asp	Glu	Glu			
145					150					155					160			
Leu	Lys	Lys	Leu	Gly	Asn	Val	Asn	Ser	Gln	Asp	Ser	Lys	Lys	Asn	Glu			
				165					170					175				
Phe	Ile	Ala	Lys	Lys	Ala	Glu	Leu	Glu	Lys	Tyr	Leu	Pro	Phe	Leu	Asn			
			180					185					190					
Ser	Leu	Gln	Lys	Glu	Tyr	Glu	Ser	Leu	Val	Ser	Lys	Val	Asn	Thr	Tyr			
		195					200					205						
Thr	Asp	Asn	Leu	Lys	Lys	Val	Ile	Asn	Asn	Cys	Gln	Leu	Glu	Lys	Lys			
	210					215					220							
Glu	Ala	Glu	Ile	Thr	Val	Lys	Lys	Leu	Gln	Asp	Tyr	Asn	Lys	Met	Asp			
225					230					235					240			
Glu	Lys	Leu	Glu	Glu	Tyr	Lys	Lys	Ser	Glu	Lys	Lys	Asn	Glu	Val	Lys			
				245					250					255				
Ser	Ser	Gly	Leu	Leu	Glu	Lys	Leu	Met	Lys	Ser	Lys	Leu	Ile	Lys	Glu			
			260					265					270					
Asn	Glu	Ser	Lys	Glu	Ile	Leu	Ser	Gln	Leu	Leu	Asn	Val	Gln	Thr	Gln			
		275					280					285						
Leu	Leu	Thr	Met	Ser	Ser	Glu	His	Thr	Cys	Ile	Asp	Thr	Asn	Val	Pro			
	290					295					300							
Asp	Asn	Ala	Ala	Cys	Tyr	Arg	Tyr	Leu	Asp	Gly	Thr	Glu	Glu	Trp	Arg			
305					310					315					320			
Cys	Leu	Leu	Thr	Phe	Lys	Glu	Glu	Gly	Gly	Lys	Cys	Val	Pro	Ala	Ser			
				325					330					335				
Asn	Val	Thr	Cys	Lys	Asp	Asn	Asn	Gly	Gly	Cys	Ala	Pro	Glu	Ala	Glu			
			340					345					350					
Cys	Lys	Met	Thr	Asp	Ser	Asn	Lys	Ile	Val	Cys	Lys	Cys	Thr	Lys	Glu			
		355					360					365						
Gly	Ser	Glu	Pro	Leu	Phe	Glu	Gly	Val	Phe	Cys	Ser							

370

375

380

<210> 14

<211> 281

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence:ALIGNMENT

<220>

<223> Amino Acids 1-115-REGION I

<220>

<223> Amino Acids 116-125-REGION II

<220>

<223> Amino Acids 126-197-REGION III

<220>

<223> Amino Acids 198-281-REGION IV

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Asp	Gln	Val	Thr	Thr	Gly	Glu	Ala	Glu	Ser	Glu	Ala	Pro	Glu	Ile	Val
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Pro	Gly	Ile	Tyr	Asp	Val	Val	Tyr	Lys	Pro	Leu	Ala	Gly	Met	Tyr	Lys
			20					25					30		

Thr	Ile	Lys	Lys	Leu	Glu	Asn	His	Val	Asn	Ala	Asn	Thr	Asn	Ile	Asp
	35						40					45			

Met	Leu	Asp	Ser	Ala	Leu	Lys	Lys	Ala	Asn	Tyr	Phe	Leu	Val	Leu	Asn
50						55					60				

Ser	Asp	Leu	Asn	Pro	Ser	Gly	Glu	Tyr	Ile	Ile	Lys	Asp	Pro	Tyr	Lys
65					70					75					80

Leu	Leu	Asp	Leu	Glu	Lys	Lys	Lys	Leu	Gly	Ser	Tyr	Lys	Tyr	Ile	Gly
				85					90					95	

Ala	Ser	Asp	Asp	Thr	Ala	Asn	Asp	Gly	Tyr	Tyr	Lys	Met	Gly	Leu	Tyr
			100					105					110		

Lys	His	Leu	Val	Lys	Val	Glu	Ile	Asp	Lys	Lys	Gly	Lys	Ala	Lys	Lys
		115					120					125			

Glu	Leu	Lys	Tyr	Leu	Pro	Phe	Leu	Ser	Gln	Lys	Glu	Tyr	Leu	Val	Lys
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

130						135						140				
Val	Tyr	Thr	Asp	Leu	Lys	Lys	Ile	Asn	Asn	Cys	Gln	Glu	Lys	Lys	Glu	
145					150					155					160	
Glu	Val	Lys	Leu	Asp	Tyr	Lys	Met	Asp	Glu	Leu	Tyr	Lys	Ser	Lys	Val	
				165					170					175		
Lys	Ser	Ser	Gly	Leu	Leu	Glu	Lys	Leu	Met	Ser	Lys	Leu	Ile	Glu	Ser	
			180					185					190			
Lys	Leu	Ser	Leu	Leu	Asn	Val	Gln	Thr	Gln	Leu	Met	Ser	Ser	Glu	His	
		195					200					205				
Cys	Ile	Asp	Thr	Asn	Val	Pro	Asn	Ala	Ala	Cys	Tyr	Arg	Tyr	Leu	Asp	
	210					215					220					
Gly	Thr	Glu	Glu	Trp	Arg	Cys	Leu	Leu	Phe	Lys	Glu	Gly	Lys	Cys	Val	
225					230					235					240	
Pro	Ala	Asn	Thr	Cys	Lys	Asp	Asn	Gly	Gly	Cys	Ala	Pro	Glu	Ala	Glu	
				245					250					255		
Cys	Lys	Met	Asp	Asn	Ile	Val	Cys	Lys	Cys	Thr	Lys	Glu	Gly	Ser	Glu	
			260					265					270			
Pro	Leu	Phe	Glu	Gly	Val	Phe	Cys	Ser								
		275					280									